AquiferData.txt

This file contains definitions for HYPE's regional aquifer module, see code `deepground` (option *2*) in the model options of info.txt and the corresponding process description in the aquifer section of the HYPE model description. Regional aquifers are linear reservoirs which connected to a group of sub-basins. These can add water, with IN and SP fluxes, to the aquifer through percolation from the deepest soil layer, and receive return flow into their main river volume. *AquiferData.txt* contains connection properties for sub-basins contributing to regional aquifers and generic properties for the aquifers themselves.

AquiferData.txt is a tab-separated file located in the modeldir folder. Sub-basins are listed row-wise. The first row contains a column header with variable names. Variable names are not case-sensitive (max. 10 characters, no spaces). Columns with headings unknown to HYPE are skipped while reading the file, but must not longer than ten characters. Columns containing character strings, e.g. descriptive meta-data, must not exceed a length of 100 characters. The columns may be in any order. A value must exist for every column and row, i.e. empty cells are not allowed. This means that in the current form, zeros have to be filled in for all aquifer-related variables in sub-basin rows and vice-versa.

Example for an *AquiferData.txt* file with two aquifers and each two contributing sub-basins (no water quality parameters):

```
NAME AREA SUBID POROSITY BASEDEPTH TOPDEPTH INIDEPTH RECHARGE AQUID RETFRAC
RETRATE DELAY PARREG
none 1500     1        0         0        0        0        1     1       0
0     0      0
none 2000     2        0         0        0        0        1     1       1
0     0      0
Aqu1 3500     0     0.15       -55       -5       -7        0     1       0
3.5E-08    10      1
none 4000     3        0         0        0        0        1     2     0.3
0     0      0
none 3200     4        0         0        0        0        1     2     0.7
0     0      0
Aqu2 7200     0     0.09       -20       -2       -4        0     2       0
1.5E-05     4      2
```

All *AquiferData.txt* variables are described in the table below.

Variable ID	Unit	Requirement	Description
`aquid`	-	All	unique aquifer ID (integer less than number of subbasins), used to connect subbasins to aquifers. A subbasin can be connected to maximum one aquifer. (mandatory)
`subid`	-	All	subbasin ID (integer). Zero is used for row which defines aquifer characteristics. (mandatory)
`recharge`	-	sub-basin	subbasin contributes to aquifer recharge (0 = no, 1 = yes)
`retfrac`	-	sub-basin	subbasin receive this fraction of the return flow from the aquifer (between 0 and 1)

Variable ID	Unit	Requirement	Description
topdepth		aquifer	depth below surface of top of aquifer (negative m) (needed for nitrogen simulation)
basedepth	*m*	aquifer	depth below surface of base of aquifer (negative)
inidepth	*m*	aquifer	initial/average water table depth (below surface) of aquifer (negative)
porosity	-	aquifer	average porosity of aquifer
area	*m2*	aquifer	aquifer horizontal area, used together with inidepth to calculate initial aquifer volume
retrate	-	aquifer	recession coefficient for aquifer return flow (between 0 and 1)
delay	*days*	aquifer	parameter for deep percolation delay (days until 63% ($1-e^{-1}$) of the flow has gotten through)
parreg	-	aquifer	parameter region for aquifer, separate from parreg in GeoData.txt (mandatory)
temp	*°C*	aquifer	temperature of aquifer (constant), also initial value of aquifer T2-temperature
conc_IN	*µg/L*	aquifer	initial concentration of inorganic nitrogen
conc_SP	*µg/L*	aquifer	initial concentration of soluble reactive phosphorus